REMARKS

Reconsideration of the present application is respectfully requested.

The present invention is directed to a resistor apparatus of the type which is prone to breakage upon becoming overheated. Such a resistor apparatus includes a resistor body 36 that includes a core 34 disposed within a gas impermeable insulative layer 32. Separate lead lines 40, 40 are attached to the core.

During operation, current travels into and out of the resistor core 34 through the first and second lead wires 40, respectively. When a large current is applied to the resistor core 34, the resistor body 36 becomes extremely hot. As different components of the resistor body 36 tend to thermally expand at different rates, thermal shock results. Also, rapid heating causes different areas of the resistor to be heated and thermally expanded at different rates, thereby also producing thermal shock. Further, water, moisture, or organic matter present in the overheated resistor is heated and produces gas. Gas trapped inside the insulating layer 32 builds up pressure. The thermal shock and heated gasses break apart the resistor body 36, thereby propelling gas and broken parts of the resistor body 36. The broken parts can damage surrounding apparatus.

The presently claimed invention relates to the provision of a flexible, gas permeable containment casing formed of a woven material in which there is enclosed a resistor body formed of a core enclosed within a gas impermeable insulation layer. The casing has sufficient tensile strength and temperature resistance to contain the broken parts while permitting the escape of the propelled gas to prevent a pressure build-up within the casing.

Amended claim 1 recites first and second lead wires and a resistor body separate from the lead wires. The resistor body includes a resistor core enclosed within a gas impermeable insulative layer. A flexible gas permeable substantially tubular containment casing formed of a woven material substantially encloses the resistor body. The containment casing has sufficient tensile strength and temperature resistance to contain broken pieces of an overheated resistor body while permitting the escape of gas.

It will be appreciated that since claim 1 recites that the containment casing is flexible (i.e., language from now-canceled claim 6) and is formed of a woven material, claim 1 is readable on the embodiments disclosed in connection with Figs. 1 and 3, but not Fig. 2.

Claim 1 was rejected as anticipated by any of Bradley, McTavish et al, Yohe, and Kohn. Bradley discloses a resistance unit, but does not deal with the phenomenon of resistor body breakage. Rather, Bradley is concerned with providing insulation for a resistance unit. The resistance unit comprises a resistance element 5 and an insulation sheath 8 therefor. Thus, the element 5 and the sheath 8 generally correspond to the core 34 and the insulative layer 32, respectively, of the present invention. Bradley does not disclose a containment casing enclosing an insulated resistor core as recited in claim 1.

McTavish is not concerned with the phenomenon of resistor breakage, but rather is attempting to minimize the adverse affects of the evolution of carbonaceous dust from a PTC conductive polymer element when it is tripped. McTavish discloses a non-insulated PTC element 1 disposed inside of a rigid casing 42. An insulating layer 43 of polyester acrylic adhesive tape is disposed around the casing 42.

Accordingly, McTavish fails to disclose the claimed combination of an insulated resistance core enclosed within a flexible containment casing formed of woven material, as recited in claim 1.

Yohe is not concerned with resistor breakage, but rather is concerned with making an elongated heating unit comprised of a bare wire 31 disposed within a layer 32 of fibrous silica, and a magnetic sheath 33. Thus, the bare wire 31 corresponds to the core 34 of the present invention. The layer 32 corresponds to the insulative layer 32 of the present invention. However, there is no gas permeable containment casing enclosing the unit 31, 32 in Yohe. That is, the element 33 of Yohe is a solid metal member and thus non-permeable. Moreover, there are no separate lead wires as presently claimed. Rather, the wire 31 itself forms connectors 31a (see column 4, lines 10-16 of Yohe).

Kohn is not concerned with resistor breakage, but rather with making a resistor from an oxidizable granular material. Kohn discloses a resistor element 4, 6 or 7 enclosed in a gas impermeable casing 1. It is clear that Kohn is attempting to eliminate permeability (see the sentence bridging pages 1 and 2 of Kohn and page 2, lines 110-116). Kohn provides an outer coating of paint or paste to further ensure impermeability. Therefore, it will be appreciated that Kohn does not disclose the combination of an insulated resistor core enclosed within a permeable containment casing as recited in claim 1, but rather teaches away from such a structure.

Accordingly, it is submitted that claim 1 and dependent claims 2, 3, 7-9 and 12 distinguish patentably over the prior art, and the present application is in condition for allowance.

Respectfully submitted,

BURNS, DOANE, SWECKER & MATHIS, L.L.P.

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By: _____
Alan E. Kopecki
Registration No. 25,813

P.O. Box 1404
Alexandria, Virginia 22313-1404
(703) 836-6620